CHAPTER 2
RISKS TO GOOD HEALTH

Disease and disability are not inevitable events to be experienced equally by all.

Each of us at birth--because of heredity, socioeconomic background of parents, or prenatal exposure--may have some chance of developing a health problem.

But, throughout life, probabilities change depending upon individual experience with risk factors--the environmental and behavioral influences capable of provoking ill health with or without previous predisposition.

Most serious illnesses--such as heart disease and cancer--are related to several factors. And some risk factors--among them, cigarette smoking, poor dietary habits, severe emotional stress--increase probabilities for several illnesses.

Moreover, synergism operates. The combined potential for harm of many risk factors is more than the sum of their individual potentials. They interact, reinforce, even multiply each other.

Asbestos workers, for example, have increased lung cancer risk. Asbestos workers who smoke have 30 times more risk than co-workers who do not smoke--and 90 times more than people who neither smoke nor work with asbestos.

It is the controllability of many risks--and, often, the significance of controlling even only a few--that lies at the heart of disease prevention and health promotion.

Major Risk Categories

Inherited Biological

Heredity determines basic biological characteristics and these may be of a nature to increase risk for certain diseases. Heredity plays a part in susceptibility to some mental disorders, infectious diseases, and common chronic diseases such as certain cancers, heart disease, lung disease, and diabetes--in addition to disorders more generally recognized as inherited, such as hemophilia and sickle cell anemia.

Actually, however, disease usually results from an interaction between genetic endowment and the individual's total environment. And although the relative contributions vary from disease to disease, major risk factors for the common chronic diseases are environmental and behavioral--and, therefore, amenable to change. Even familial tendencies toward disease may be explained in part by similarities of environmental and behavioral factors within a family.

Environmental

Evidence is increasing that onset of ill health is strongly linked to influences in physical, social, economic and family environments.

Influences in the physical environment that increase risk include contamination of air, water, and food; workplace hazards; radiation exposure; excessive noise; dangerous consumer products; and unsafe highway design.

Over the past 100 years, man has markedly altered the physical environment. While many changes reflect important progress, new health hazards have come in their wake. The environment has become host to many thousands of synthetic chemicals, with new ones being introduced at an annual rate of about 1,000--and to byproducts of transportation, manufacturing, agriculture and energy production processes.

Factors in the socioeconomic environment which affect health include income level, housing, and employment status. For many reasons, the poor face more and different health risks than people in higher income groups: inadequate medical care with too few preventive services; more hazardous physical environment; greater stress; less education; more unemployment or unsatisfying job frustration; and income inadequate for good nutrition, safe housing, and other basic needs.

Family relationships also constitute an important environmental component for health. Drastic alterations may occur in family circum- stances as spouses die or separate, children leave home, or an elderly parent moves in. An abrupt major change in social dynamics can create emotional stress severe enough to trigger serious physical illness or even death. On the other hand, loving family support can contribute to mental and physical well-being and provide a stable, nurturing atmosphere within which children can grow and develop in a healthy manner.

Behavioral

Personal habits play critical roles in the development of many serious diseases and in injuries from violence and automobile accidents.

Many of today's most pressing health problems are related to excesses--of smoking, drinking, faulty nutrition, overuse of medications, fast driving, and relentless pressure to achieve.

In fact, of the 10 leading causes of death in the United States (Figure 2-A), at least seven could be substantially reduced if persons at risk improved just five habits: diet, smoking, lack of exercise, alcohol abuse, and use of antihypertensive medication.

Risk Variability

Because risk factors interact in different ways, population groups which differ because of geographic

Figure 2-A

Causes of Death by Life Stages, 1977

PROBLEM \ AGE GROUPS	Infants (Under 1)		Children (1–14)		Adolescents/ Young Adults (15–24)		Adults (25–44)		Adults (45–64)		Older Adults (Over 65)		Total Population (all ages)	
	Rank	Rate[1]	Rank	Rate[2]	Rank	Rate[2]	Rank	Rate[2]	Rank	Rate[2]	Rank	Rate[2]	Rank	Rate[2]
Chronic Diseases														
Heart Disease			7	1.1	6	2.5	2	25.5	1	351.0	1	2334.1	1	332.3
Stroke			8	.6	9	1.2	8	6.1	3	52.4	3	658.2	3	84.1
Arteriosclerosis											5	116.5	9	13.3
Bronchitis, Emphysema, & Asthma									10	12.2	8	69.3		
Cancer			3	4.9	5	6.5	1	29.7	2	302.7	2	988.5	2	178.7
Diabetes Mellitus					10	.4	10	2.4	8	17.8	6	100.5	7	15.2
Cirrhosis of the Liver							7	8.6	4	39.2	9	36.7	8	14.3
Infectious Diseases														
Influenza and Pneumonia	5	50.6	6	1.5	8	1.3	9	3.0	9	15.3	4	169.7	5	23.7
Meningitis			8	.6										
Septicemia	6	32.7												
Trauma														
Accidents														
Motor vehicle accidents			2	9.0	1	44.1	3	23.1	7	18.3	10	24.5	6	22.9
All other accidents	7	27.7	1	10.8	2	18.4	4	18.5	5	25.5	7	78.1	4	24.8
Suicide			10	.4	3	13.6	5	17.3	6	19.1			9	13.3
Homicide			5	1.6	4	12.7	6	15.6						
Developmental Problems														
Immaturity associated	1	407.7												
Birth-associated	2	294.4												
Congenital birth defects	3	253.1	4	3.6	7	1.6								
Sudden infant deaths	4	142.8												
All causes		1412.1		43.1		117.1		182.5		1,000.0		5288.1		878.1

[1]Rate per 100,000 live births.
[2]Rate per 100,000 population in specified group.

location, age, and/or socioeconomic strata can experience substantial variability in disease incidence. And investigations of the variability can provide important clues about the extent to which major causes of disease and death may be preventable.

Contrasts between different groups within the United States will be discussed throughout Section II. Here, it is interesting to note some of the striking influences which international variations in habits and environs can have.

For example, an American man, compared to a Japanese man of the same age, is at 1.5 times higher risk of death from all causes, five times higher for death from heart disease, and four times higher for death from lung cancer. And for breast cancer, the death rate for American women is four times as great as for Japanese women. On the other hand, a Japanese man is eight times as likely to die from stomach cancer as his American counterpart. Other Western countries such as England and Wales, Sweden, and Canada have experiences generally paralleling our own although rates vary somewhat from country to country.

The importance of environment and cultural habits, rather than heredity alone, is suggested by studies of Japanese citizens who have moved to the United States. They indicate that, with respect to cardiovascular disease and cancer, families who migrate tend to assume the disease patterns of their adopted country.

Age-Related Risks

From infancy to old age, staying healthy is an ever-changing task. The diseases that affect young children are not, for the most part, major problems for adolescents. From adolescence through early adulthood, accidents and violence take the largest toll. And these are superseded a few decades later by chronic illness--heart disease, stroke and cancer. Figure 2-A depicts major causes of death by life stages.

In one respect, this age orientation is misleading. Although heart disease, stroke, and cancer are commonly regarded as adult health problems, their roots--and, indeed, the roots of many adult chronic diseases--may be found in early life. Early eating patterns, exercise habits, and exposure to cancer-causing substances all can affect the likelihood of developing disease many years later. Some studies have found high blood pressure and high blood levels of cholesterol in many American children. The presence of two such potent risk factors for heart disease and stroke at early ages point to the need to regard health promotion and disease prevention as lifelong concerns.

At each stage of life, different steps can be taken to maximize well-being--and the health goals described in the next section deal with the major health problems of each group.*

Assessing Risk

Risk estimates are derived by comparing the frequency of deaths, illnesses or injuries from a specific cause in a group having some specific trait or risk factor, with the frequency in another group not having that trait, or in the population as a whole.

Some diseases may occur more frequently in a small population group--for example, a rare type of liver cancer among workers handling vinyl chloride. Such a high risk group, of course, is not difficult to identify although many deaths may occur before the disease cause is clearly established.

* The Nation's leading health problems are not only those which cause death. Other significant conditions--such as mental illness, arthritis, learning disorders, and childhood infectious diseases--provoke considerable sickness, disability, suffering, and economic loss. These problems are considered in this report--but, for overview purposes, the leading causes of death provide useful indications of some of the prominent risk factors faced by each age group.

But increases in more common diseases not confined to isolated population groups may be much more difficult to attribute to a specific cause. For example, after cigarette smoking was widely adopted, lung cancer rates began to increase dramatically, not immediately but after about a 20-year interval. Because of the large numbers of diverse people and the long interval involved, many theories had to be considered before the direct link between cigarette smoking and lung cancer was firmly established.

The presence of a risk factor need not inevitably presage disease or death. But those events can arise from the cumulative effect of adverse impacts on health. The chain of events may be short, as in a highway accident, or long and complex, as in the development of coronary artery disease and the heart attack which may follow.

Some diseases may involve a single significant risk, such as lack of immunization. Others involve many contributing factors. Those associated with coronary artery disease, for example, include heredity, diet, smoking, uncontrolled hypertension, overweight, lack of exercise, stress, and possibly other unknown factors.

The Role of the Individual

Because there are limits to what medical care can presently do for those already sick or injured, people clearly need to make a greater effort to reduce their risk of incurring avoidable diseases and injuries.

This is not to suggest that individuals have complete control and are totally responsible for their own health status. For example, although socioeconomic factors are powerful determinants, individuals have limited control over them. Nor can they readily decrease many environmental risks. The role of the individual in bringing about environmental change is usually restricted to that of the concerned citizen applying pressure at key points in the system or process. But the individual must rely

in large part on the efforts of public health officials and others to reduce hazards.

People must make personal lifestyle choices, too, in the context of a society that glamorizes many hazardous behaviors through advertising and the mass media. Moreover, our society continues to support industries producing unhealthful products, enacts and enforces unevenly laws against behaviors such as driving while intoxicated, and offers ambiguous messages about the kinds of behavior that are advisable.

Finally, although people can take many actions to reduce risk of disease and injury through changes in personal behavior, the health consequences are seldom visible in the short run. Even when the individual knows that a habit such as eating excessive amounts of high-calorie, fatty food is not good, available options may be limited. And some habits such as alcohol abuse and smoking may have become addictive.

To imply, therefore, that personal behavior choices are entirely within the power of the individual is misleading. Yet, even awareness of risk factors difficult or impossible to change may prompt people to make an extra effort to reduce risks more directly under their control and thus lessen overall risk of disease and injury. Healthy behavior, including judicious use of preventive health care services, is a significant area of individual responsibility for both personal and family health.

The following sections of this report will clarify the role of various risk factors in disease and disability.